



## ***Cortical Visual Impairment***

### ***What is cortical/cerebral visual impairment?***

Cortical visual impairment (CVI) is a decreased visual response due to a neurological problem affecting the visual part of the brain. Typically, a child with CVI has a normal eye exam or has an eye condition that cannot account for the abnormal visual behavior. Children with CVI display characteristic behaviors. It is one of the most frequent causes of visual impairment in children from developed countries.

### ***What is delayed visual maturation (DVM)?***

Delayed visual maturation is similar to cortical visual impairment in that an infant has a normal eye exam but does not demonstrate typical visual behavior. Unlike CVI, the visual response improves in a child with delayed visual maturation and resolves by one year of life.

### ***Is “cortical blindness” the same thing as CVI?***

Cortical blindness is an older term for CVI. The term “blindness” can be misleading. Children with CVI usually have some level of vision that may show some improvement over time.

### ***How does normal vision work?***

The eyes take a picture of an object. That message is sent to the brain by way of the optic nerves. The brain recognizes the image and integrates it with other sensory messages (hearing, touch, smell, taste). The brain then responds to the sensory input by sending a motor response to the appropriate part of the body.

### ***How does vision work in CVI?***

The eye structure in CVI is usually normal. The eye takes a normal picture of the object and sends the message to the brain. The message is not properly processed or integrated because of the abnormal brain function.

Damage to the posterior visual pathways results in characteristic visual behaviors depending upon which of the visual centers or association areas is involved. Damage to the optic tracts and radiations can result in abnormalities of the visual field (blind spots).

### ***What causes CVI?***

CVI is caused by any process that damages the visual parts of the brain. Examples include: brain damage from prematurity, stroke, decreased blood supply, decreased oxygenation, brain malformation or infection, hydrocephalus (increased pressure in the brain), seizure, metabolic disease, infection, head trauma and other neurologic disorders.

### ***What visual characteristics are associated with CVI?***

- Distinct color preference
- Delayed visual response (latency)
- Abnormalities of visual field
- Difficulty with unfamiliar visual stimuli
- Preference for looking at lights
- Unusual visual behaviors
- Better vision when viewing moving objects compared to stationary objects
- Better visual response for near objects vs distant objects
- Difficulty with complex visual objects, groupings or environments

### ***Does vision improve in CVI?***

As the brain matures new connections can develop in the brain to overcome the initial injury or deficit and improve the function, however it is difficult initially to predict future visual function. Interventions based on the characteristics seen in children with CVI can help maximize performance. Vision improvement is seen in many children with CVI.

### ***Can CVI be treated?***

Treatment of any underlying neurologic disease is essential and should be organized by the primary care physician and/or pediatric neurologist. A pediatric ophthalmologist can diagnose visual impairment from CVI which provides medical necessity for vision services. The pediatric ophthalmologist will also diagnose and treat eye medical conditions which could further impair vision. The child should be referred for vision services evaluation from the appropriate local agency. It is important to start early intervention to help stimulate visual development. It is crucial to have treatment as early as possible to maximize the benefit. Young children may receive services through their early intervention program while school age children may receive services through their local school district.

### ***How is a treatment for CVI determined?***

Each child with CVI must have a functional assessment by a teacher of the visually impaired or other qualified team member focused on the specific problems commonly found in children with CVI. A teacher of the visually impaired will perform an assessment of the child and provide recommendations for accommodations based on characteristic behaviors which will help the child to use their vision most efficiently. This assessment will guide the treatment for each child.

### ***What type of stimulation is helpful for infants with CVI?***

- Large, high contrast, lighted, reflective and moving objects; e.g. mobiles
- Touch or sound to attract child's attention



- Visual materials presented in a simple uncluttered manner with increasing complexity as tolerated
- Presentation of visual material from different directions/angles
- Variable level of light in environment (some children do better with a lighted toy in dim room initially)
- Extra time for responses to visual stimuli
- Avoidance of over stimulation
- Avoidance of visual tasks when child is hungry, tired, frustrated, etc.

### ***How can parents or caregivers help the physicians care for children with CVI?***

Parents/caregivers should keep a written list of specific problems/changes/observations for discussion at each physician visit.

### ***Do children with CVI need an eye examination?***

Yes. Some children with CVI have other associated visual disorders such as structural eye disease, misaligned eyes, or a significant refractive error. A pediatric ophthalmologist can evaluate the eyes to see if they are healthy, or if there is an abnormality in the eye that is contributing to the visual issues. Treating these associated conditions may include glasses or eye muscle surgery and can help maximize visual function.

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